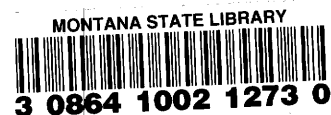


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PERFORMANCE REPORT

STATE: MONTANA

GRANT TITLE: MONTANA ENDANGERED FISHES PROGRAM
GRANT NUMBER: SE-7-5

LOCATION: Missouri River, Montana

AUG 04 2003

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PERIOD COVERED: July 1, 1998 through June 30, 1999

PROJECT PERSONNEL:

Bill Gardner Fishery Biologist Lewistown 406-538-4658

OBJECTIVE:

1. To determine habitat preferences, movements, and stocking success of hatchery-reared juvenile pallid sturgeon. Progress was made on this objective and results are reported below.

COSTS: A total of \$11,111.11 in federal and state funds were expended on this project.

RESULTS:

The study objective was to investigate movement patterns, habitat preferences and ultimately the success of stocking hatchery reared yearling pallid sturgeon in the Upper Missouri River. Hatchery reared yearling pallid sturgeon were released for the first time into the Upper Missouri River Recovery Priority Management Area 1 on August 18, 1998. A total of 714 pallids from the Gavins Point National Fish Hatchery were released at 3 sites in a 158-mile reach of river upstream of Fort Peck Reservoir; 238 pallids were released each near Loma (RM-2051), Judith Landing (RM-1984) and Robinson Bridge (RM-1921). Additionally, 44 radio-tagged yearling pallids were released at the above 3 sites and monitored so that inferences regarding both transmitted and non-transmitted pallids could be made based on the study results of the transmitted fish. (Refer to Gardner, 1998b for a description of methods).

The study area was confined to a 158-mile reach of the Missouri River immediately upstream of Fort Peck Reservoir (Figure 1). A total of 44 yearling pallid sturgeon were surgically implanted with radio transmitters and their movement patterns and habitat use were monitored from August 19 to early November 5, 1998. A total of 14 were released at Loma, 14 at Judith Landing and 16 at Robinson Bridge. Only 18 of the 44 radio-equipped pallids were relocated 3 times or more and telemetry results are

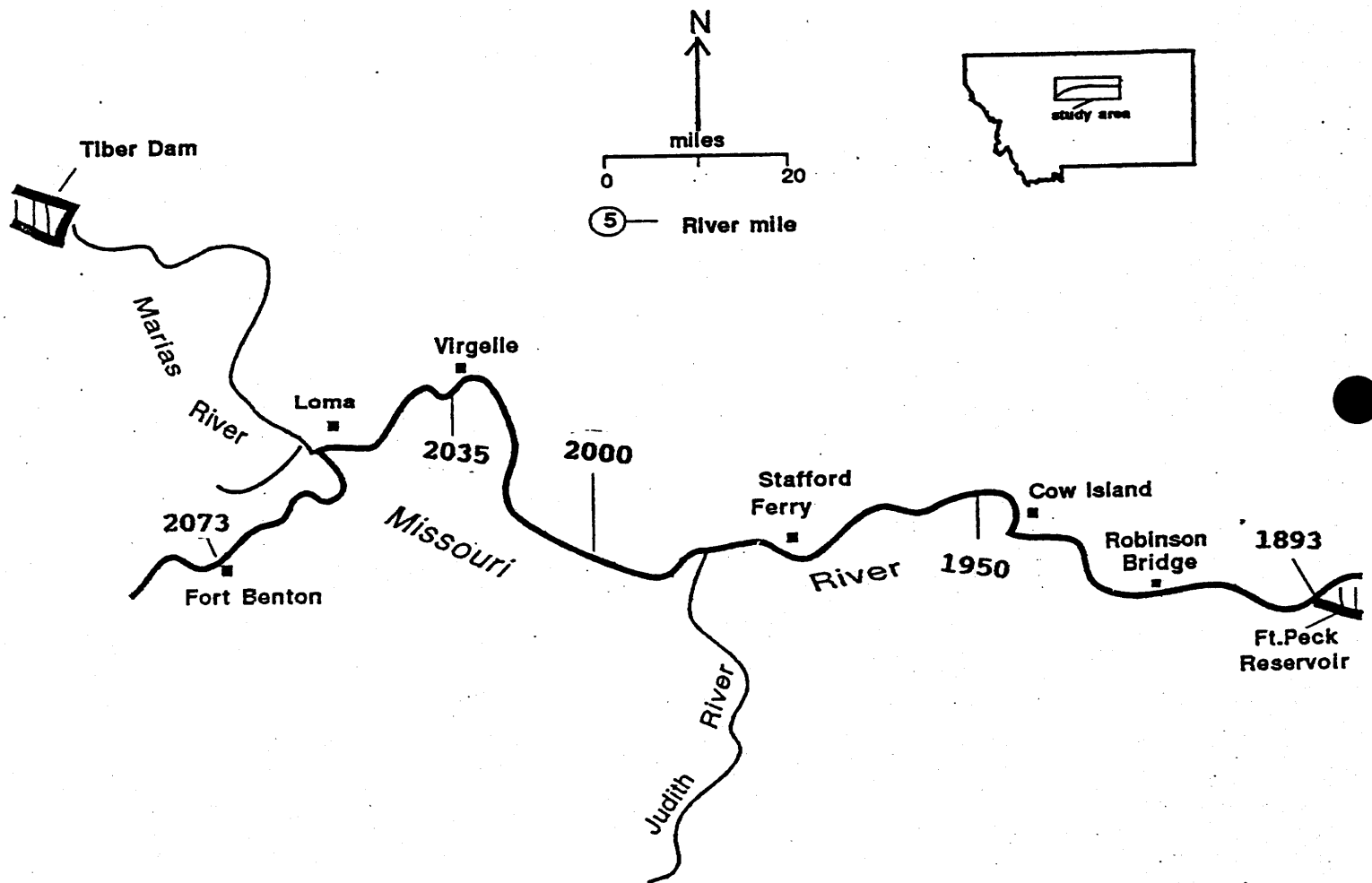


Figure 1. Map of study area.

reported only for these fish. A total of 85 contacts were made with these 18 pallids during the 78-day period. The reasons for loss of contact with the remaining 26 of the 44 transmitted pallids could have been related to the difficulty of relocating the pallids in the large and remote study area.

Table 1 summarizes the sturgeon travel distances on a monthly basis. At all the release sites the general trend was for the pallids to drift downstream, however at a much different pace. The Loma released radio tagged pallids traveled downstream at an average rate of 31.2 miles/month compared to 4.0 and 1.0 miles/month for the Judith Landing and Robinson Bridge pallids. The greatest travel distances occurred during October/November, the last period monitored. Upstream travel by the pallids was limited and occurred only at the Judith Landing release site where one of the 4 pallids moved 4.7 miles upstream from the release site to a deep pool.

Table 1. Monthly average and minimum/maximum distances moved (miles) for 18 transmitted hatchery-reared juvenile pallid sturgeon monitored in the Upper Missouri River, August 19 - November 5, 1998.

	Number of Relocations	Avg. distance(mi) from release site	Min/Max distances(mi) from release site
LOMA			
August	5	2.9	(0.7 - 7.4)
September	14	16.7	(0.7 - 38.6)
Oct-Nov.	6	65.4	(5.9 - 116.7)
JUDITH			
August	4	1.3	(+0.9 - 2.3)
September	9	5.4	(+4.7 - 15.4)
Oct-Nov.	3	9.4	(+6.4 - 41.1)
ROBINSON			
August	2	3.9	(2.5 - 5.4)
September	28	2.7	(0.2 - 5.4)
Oct-Nov.	12	5.6	(0.2 - 12.0)

A total of 50 microhabitat measurements were taken on the 18 radio-tagged pallids. Monthly average values for each habitat parameter are reported in Table 2. Transmitted pallids were mostly found in moderately deep water areas averaging 6.2 ft. and ranging between 2.5 and 10.7 ft. Channel depths where the juvenile pallid sturgeon were relocated ranged from 2.5 to 10.7 feet. River current velocities where pallids were relocated averaged 2.5 ft/s which was less than the average river current of 3.2 ft/s reported by Gardner (1994). Average percent of maximum depth category is a parameter that considers the relative depth where the sturgeon was located. The sturgeon may be located in a reach that is characteristically shallow but is found in the deepest site available in that particular area. For example, the cross-section where the fish is located ranges in depth from 2 to 6 feet and the sturgeon was located at 6 feet, then it would be at 100% of the maximum depth. The overall average percent of maximum depth was 69% indicating that transmitted pallids somewhat preferred the deeper sites within the cross-section of the river channel. The moderately strong preference for deep water areas was further demonstrated by the pallids relatively close association to the thalweg. Average distance from the thalweg was 126 feet; a distance of only 25% of the average channel width. There appeared to be a preference by the pallids for sites with sharp changes in channel depths. On several occasions pallids were relocated by shallow areas with sudden drop-offs.

It is interesting to compare habitat use by pallids with that of shovelnose sturgeon. Juvenile shovelnose sturgeon were monitored in the study area during the previous year, 1997. These 36 radio transmitted shovelnose were found at an average depth of 9.1 feet, average river current velocity of 2.1 ft/s and an average distance from the thalweg of 142 feet (Gardner 1998a). The shovelnose had similar habit parameter measurements compared with the pallid with the exception of average depth, where the shovelnose average was nearly 3 feet deeper.

Table 2. Summary Microhabitat Statistics for transmitted juvenile pallid sturgeon, Upper Missouri River, 1998.

	ALL	AUG	SEP	OCT/NOV
LOMA				
Number Observ.	19	3	12	4
Average Depth-ft	5.6 (2.5-9.1)	7.7 (4.6-9.3)	5.3 (2.5-8.1)	4.0 (4.3-5.5)
Average % of Max Dep	72% (33-100)	74% (55-84)	67% (33-100)	84% (75-93)
Average Column Velocity (fps)	2.9 (1.7-4.6)	3.4 (2.6-4.1)	2.8 (1.6-4.6)	2.8 (2.4-3.6)
JUDITH				
Number Observ.	9	2	6	1
Average Depth(ft.)	6.5 (2.8-9.5)	5.8 (4.7-7.0)	6.8 (2.8-9.5)	6.0 ---
Average % of Max Dep	72% (39-100)	82% (74-89)	72% (39-100)	100%
Average Column Velocity (fps)	2.5 (1.6-3.2)	2.9 (2.5-3.2)	2.2 (1.6-2.6)	3.1

Table 2. (continued)

	ALL	AUG	SEP	OCT/NOV
ROBINSON				
Number Observ.	22	4	11	7
Average Depth-ft	6.5 (3.0-10.7)	6.2 (4.7-7.0)	6.7 (3.0-10.7)	6.4 ---
Average % of Max Dep	66% (18-98)	58% (38-78)	68% (18-90)	67% (23-98)
Average Column Velocity (fps)	2.2 (1.6-2.7)	2.0 (1.8-2.6)	2.3 (1.6-2.7)	2.1 (1.8-2.5)
COMBINED				
Number Observ.	50	6	29	15
Average Depth(ft.)	6.2 (2.5-10.7)	6.7 (4.6-9.3)	6.1 (2.5-10.7)	6.0 (3.3-9.8)
Average % of Max Dep	69 (23-100)	74 (55-89)	67% (18-100)	72% (23-100)
Average Column Velocity (fps)	2.5 (1.6-4.6)	2.9 (1.9-4.1)	2.5 (1.6-4.6)	2.3 (1.8-3.6)

The transmitted pallids were generally found at areas with sand and gravel substrates. Seventy-three percent of the pallid relocations occurred at sand/gravel sites. With the exception of adult pallids preferring the deepest areas of the river, transmitted yearling pallid sturgeon in the middle Missouri River used habitats similar to that reported for the adult pallid sturgeon residing in this reach (Gardner 1994). Like the wild sturgeon, juvenile pallids were not found in the slow shallow peripheral areas of the river, but were always found in main channel areas.

A total of 36 trammel net drifts (3/radio located pallid) were made at sites where transmitted pallids were located in an attempt to recapture the radio tagged pallid and collect information on species associations. None of these attempts were successful at capturing the juvenile pallids, however, several other fish in the vicinity of the pallid were netted (Table 3). A total of 79 fish representing 8 species were sampled while attempting to capture transmitted pallids. Fifty-eight percent of the catch were adult shovelnose sturgeon. Flathead chub and goldeye were the other more common species sampled.

Of the 18 transmitted pallids that we monitored during the 2½ month period, it appeared that all survived and were fairly active, residing in areas that were favored by shovelnose. This indicates that the 714 non-transmitted pallids also probably had a high initial survival rate since the radioed pallids were a sample of the larger group. Three non-transmitted juvenile pallids from the 1998 stocking effort were captured in the lower portion of the study area. Two micro-tagged pallids were captured while trawling on September 23, 1998; one at RM-1918.0 and the other at RM-1914.0 (Lee Bergstedt; MSU; personal communication). Both these pallids were from the group of pallids released at the nearby Robinson Bridge location on 8/18/98. A third micro-tagged pallid was captured by trawl on October 30, 1998, in the same vicinity as the two above at RM-1917.7. Tagging information indicated that this was a from the group of pallids released at Loma (RM-2051.2) 133.5 miles upriver on 8/18/98.

Table 3. Number of fish caught while drifting a trammel net over a located transmittered sturgeon in the upper Missouri River, August - September, 1998.

Id no. of Radio pallid Attempted	Date	No. of Taxa	Number of Shovelnose Sturgeon	No. of Drifts	River mile
742-A	8/15	3	6	2	1919.0
791-P	9/15	5	6	3	1919.0
831-P	9/16	3	3	3	1920.4
811-P	9/16	0	0	2	1920.4
771-A	9/16	2	2	2	1916.0
791-A	9/17	4	24	3	2014.2
701-A	9/22	4	9	3	2028.0
151-A	9/23	4	0	3	1982.5
031-A	9/23	2	7	2	1987.1
781-A	9/24	2	2	3	1916.4
742-A	10/7	4	2	3	1918.2
742-A	10/15	2	1	3	1919.3

RECOMMENDATIONS:

Continue with the radio telemetry study so that another season of data can be collected and compared with the 1998 results. During 1999, the USGS will be mapping the Robinson Bridge release area. Pallid monitoring will be especially valuable here because information of pallid habitat use can be incorporated into the USGS habitat simulation model.

Present information indicates that the juvenile pallids stocked in the Loma area may have drifted out of the area at an unacceptable amount. Therefore, the Loma stocking site should be relocated to Coal Banks, 22 miles downriver where the stream gradient is flatter.

Fewer different radio frequencies should be used so that a more thorough coverage could be accomplished while conducting aerial radio searches over the 158-mile study area. This would require that 10 pallids be on the same frequency and therefore, only group but not individual movements can be monitored.

BENEFITS:

Results of this radio telemetry study on juvenile pallid sturgeon will greatly improve the success of stocking program in the future. Release locations, survival and habitat selection by hatchery reared pallids were evaluated and provided important insight on the success of this effort.

The radio telemetry information will also be useful to the US Bureau of Reclamation for managing their upstream storage reservoirs to benefit pallid sturgeon recovery. The Robinson Bridge pallid release site and downstream area will be mapped by the USGS in 1999 and a 2-dimensional model will be developed (Ken Bovee, personal communication). This will enable us to plot pallid sturgeon relocations and develop habitat preference curves for quantifying pallid habitat and predicting habitat changes at a variety of flow scenarios.

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LITERATURE CITED

- Gardner, W.M. 1994. Statewide fisheries investigations, Missouri River pallid sturgeon inventory. Mont. Dept. of Fish Wildlife and Parks. Helena. Fed. Aid to Fish and Wildlife Rest. Proj. F-46-R-7. 32 pp.
- Gardner, W.M. 1998a. Missouri River pallid sturgeon study. Montana endangered fishes program. SE-7-4. Mont. Dept. Fish Wildlife and Parks. Helena. Fed. Endangered Species Section 6. 5 pp.
- Gardner, W.M. 1998b. Statewide fisheries investigations, Middle Missouri River fisheries evaluations - 1997 annual report. Mont. Dept. of Fish Wildlife and Parks. Helena. Fed. Aid to Fish and Wildlife Rest. Proj. F-78-R-4. 38 pp.